

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO THE EVALUATION REPORT OF SAN ONOFRE GENERATING STATION
UNIT 1 SPENT FUEL POOL
MATERIALS AND CHEMICAL ENGINEERING BRANCH
TAC NO. M91975
SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION UNIT 1
DOCKET NO.: 50-206

I. INTRODUCTION

By correspondence dated March 10, 1995, the Southern California Edison Company (the licensee) submitted a review of San Onofre Nuclear Generating Station Unit 1 (SONGS-1) spent fuel pool evaluation report. The review addressed the potential for negative long-term metallurgical effects to the SONGS-1 spent fuel pool stainless steel liner from contact with poor quality water. This safety evaluation reviews the long-term negative effect of the material used in the spent fuel pool liner plate when in contact with poor quality water.

II. EVALUATION

The spent fuel pool liner is attached to a concrete shell by welding to embedded plates and structural angles. The structural material used for spent fuel pool liner is ASTM A-240, Type 304 stainless steel. This material is commonly used in nuclear power plants and spent fuel pools. To monitor leakage through the liner, there is a leak chase system that is connected to a 12 inch diameter pipe which serves as the leak detection well. These channels direct any water leakage through pipes into the leak detection well which is located outside the building north wall.

Brackish groundwater could potentially leak into the spent fuel pool. In order to prevent this, there is a water proof membrane which serves the dual purpose of preventing in-leakage of groundwater into the building and leakage of spent fuel pool water to the groundwater and soil.

Pin-hole leaks in the stainless steel liner occurred between 1986 and 1989 that were localized pitting at welding defects in the upender portion of the spent fuel pool liner. The pits were epoxy repaired during the Cycle 10 refueling outage in January 1989. The leakage went from 100 gal/day to 3.5 gal/day after the epoxy repair. Examination of the leak detection well in May 1993 showed that the well was dry and that the leakage had stopped. The licensee drained the area and visually inspected the surrounding area of the spent fuel pool liner. The licensee concluded that there was no detrimental long-term effect to the stainless steel liner.

There was a possibility that the leakage from the spent fuel pool had contaminated the soil around the Fuel Storage Building. The Radiological Environmental Monitoring Program requires that the shoreline sediment, ocean bottom sediment, and ocean water be monitored for the presence of radiological species. No radio nuclides have been detected in any of the environmental media indicating that no radiological contamination has occurred as a result of SONGS operations.

Control of water impurities in nuclear plant spent fuel pool water is typically provided by the spent fuel pool demineralizers in the spent fuel cooling system. The demineralizers function to keep the chemistry of the spent fuel water approximately the same as that of the reactor coolant system, in order to minimize the probability of abnormal chemistry excursions during refueling operations when the two systems are linked together. Control of spent fuel pool concentrations of water chemistry also serves to reduce corrosion effects by keeping the concentration of water impurities at low levels.

The chemical analysis of the water in the leak chase system indicates that the water chemistry is different than the water chemistry in the spent fuel pool. It appears that groundwater intrusion is occurring in the spent fuel pool leak chase system. Therefore, spent fuel pool leak rates may be overstated if a portion of the water is from groundwater intrusions.

The upender area of the spent fuel pool was drained and inspected. There was no evidence of corrosion or cracking in the upender area. Previous leak repairs appeared to be intact. Based on the spent fuel pool chemistry which is low in halides and high pH and low water temperature, the licensee at SONGS does not anticipate any stress corrosion cracking in the future.

III. CONCLUSIONS

Based on the submittal by the licensee at SONGS, it does not appear that the long-term integrity of the stainless steel liner in the Unit 1 spent fuel pool is in question. This is based on the low temperature, low halide concentration, and high pH in the spent fuel pool. The licensee at SONGS should continue to investigate if groundwater intrusions are continuing into the spent fuel pool leak chase system to ensure no deleterious species contaminate the spent fuel pool water.